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Maintenance Management Performance – An Overview towards Evaluating Malaysian Palm Oil Mill

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ABSTRACT

Deficient maintenance management can severely affect competitiveness of an organization by reducing throughput, increasing inventory, and leading to poor performance. Performance cannot be managed without measurement: it provides the required information to the management for effective decision making; and is used by industries to assess progress against set goals and objectives in a quantifiable way for effectiveness and efficiency. For the palm oil mills to stay competitive, it is imperative that they elevate the maintenance management role; from a cost center to the strategic partner in business. This paper highlights how measuring maintenance performance helps us identify the factors causing poor performance, and provides an opportunity to improve company's profits.

Key words: key performance indicators, lean, total productive maintenance

Introduction

In manufacturing context, maintenance management is the process of directing maintenance organization effectively by utilizing administrative, human, financial, and material resources in an efficient and effective way through planning, scheduling, executing and monitoring their own progress for continuous improvement. Maintenance management's role is to provide support to production, and by providing reliable equipment and processes it helps organization to be competitive and contribute to sustainable profitability; socially, economically and environmentally. It is no longer a cost center but a strategic business partner that plays a vital role that helps the organization to achieve its goals. Maintenance management performance can be evaluated using key performance indicators (KPIs): This provides vital information to the management for decision making; it helps to identify inefficiencies in the systems and provides an opportunity for improvement.

It is evident from the literature that maintenance is still a low priority in the SMIs of Malaysia, 23 % - according to Shamsuddin Masjuki *et al.*, 2004. In today's operating environment, both management and the operation of the oil palm estates and crude palm oil mills need effective team work, fruitful synergy effect on each other, cross-functional responsibility and accountability, inter personnel co-operation and relationship, reduced bureaucracy and resources utilization to achieve higher productivity and better quality product. In order to stay competitive in the 21st century, it is imperative, for the palm oil mills to recognize the importance of maintenance management and elevate its role to the strategic business level.

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Maintenance Management and Maintenance Strategies

With increased global competition, attention has been shifted from increasing efficiency by means of economies of scale and internal specialisation to meeting market conditions in terms of flexibility, delivery performance and quality (Yamashina, 1995; Karuppuswamy *et al.*, 2007). In today's dynamic environment, a reliable production system must be seen as a critical factor for competitiveness (Brah and Chong, 2004). Poor organisational competencies in managing the maintenance function effectively can severely affect competitiveness by reducing throughput, increasing inventory, and leading to poor due-date performance (Patterson *et al.*, 1996, Ashayeri, 2007). This has provided the impetus to the leading organizations worldwide to adopt effective and efficient maintenance strategies such as condition-based maintenance (CBM), reliability-centered maintenance (RCM) and total productive maintenance (TPM), over the traditional firefighting reactive maintenance approaches (Sharma *et al.*, 2005). The term "lean production" was introduced by Krafcik (1989) and by Womack *et al.*, (1990) in the book The Machine That Changed the World.

Lean production can be considered an extended JIT that includes new intra-organizational and inter-organizational aspects (Enkawa and Schvaneveldt, 2001; Holweg, Matthias, 2007). Lean implementation is therefore focused on getting the right things to the right place at the right time in the right quantity to achieve perfect work flow, while minimizing waste and being flexible and able to change. Lean maintenance is a pre-requisite for Lean manufacturing

Maintenance Performance and evaluation

Performance measurement is a management tool to measure the direction and speed of change done by the company. Performance measurement plays an important role for the improvement of a progress (change) towards a better performing organization. Therefore, we need to formulate appropriate performance indicators. These indicators must be directly linked with company's strategic objectives (Gasperz, V. 2003). Measuring maintenance performance helps us identify the factors causing poor performance, and provides an opportunity to improve company's profits.

Besides, performance measurement is also a way for the management to evaluate the condition of its systems and make a decision relating to maintenance policy adapted by the company. Maintenance activity is an activity that has a significant contribution in operation costs, approximately 30 percent of operation costs, especially if the company is implementing automated production system (Garg, A., and Deshmukh, S. G., 2006).

Here are some of the key performance measuring tools being applied in the industry, depending on the strategies adopted. Strategic TPM implementation programs have revealed a significant realisation of manufacturing performance achievements leading to improved core competitiveness of organisations (Ahuja and Khamba, 2008, a, b).

TPM's Key Performance Indicators (Metrics) and Operational Availability (OA)

The first metric for TPM is MTBF (Mean Time between Failures). This is measured by machine, and for this metric, the larger number the better it is. The second metric is Percent Reactive Maintenance (% Reactive). The smaller the number the better it is. World class is 20% or less reactive and 80% preventive, improvement, or scheduled maintenance. Mean Time to Repair (MTTR) is the third metric. For this metric, the smaller the number the better it is. As TPM progresses, repairs are less serious and are quicker. Tracking repair hours and showing an overall reduction is a direct cost savings. The fourth metric is Overall Equipment Effectiveness (OEE).

This is measured by machine or by process. The higher the number the better it is. World class is 85% or better. Direct financial impact can be shown as machines run faster with better quality more reliably. TPM seeks to improve the overall equipment effectiveness (OEE), which is an important indicator, used to measure TPM. An overall 85 percent of OEE is considered as world class and a benchmark for others (Blanchard, 1997; McKone *et al.*, 1999; Chand and Shirvani, 2000). Operational Availability (OA) - is a measure of the "real" average availability over

a period of time and includes all sources of downtime, such as administrative downtime, logistic downtime, etc. It is the ratio of the system uptime to total time. Mathematically, it is given by: OA= UPTIME / OPERATING CYCLE; where the operating cycle is the overall time period of operation being investigated and uptime is the total time the system was functioning during the operating cycle. (*Note*: The operational availability is a function of time, *t*, or operating cycle.)

Malaysian Palm Oil Industry and Palm Oil Mills – Importance and Scope

There are 434 palm oil mills operating in Malaysia. The processes used are broadly similar and primarily involve: transportation of the fresh fruit bunches (FFBs); sterilization; stripping; digestion and pressing; clarification; nut/fibre separation; nut conditioning and cracking; cracked mixture separation; and kernel drying. The Malaysian palm oil industry recorded an impressive performance in 2008 where the export earnings of the oil palm products rose to a record RM 65.2 billion. Palm Oil currently contributes about 5-6% of Malaysian GDP and provides employment for 1.4 million workers (direct employment of 570,000). It triggers downstream activities and brings in revenues for national development and stability, with foreign exchange earnings amounting to an average of US$ 11.5 billion annually. However, over the years, Malaysia has been losing her market share to Indonesia; Indonesia is now the largest producer of palm oil in the world (MPOB, 2008). Malaysian Palm Oil Board's National Seminars on Palm Oil Milling, Refining Technology, Quality and Environment clearly emphasize the need to; lower the costs of production, increase productivity, and improve quality by adopting new environmentally friendly technologies. The trend in modern maintenance systems, to integrate maintenance systems to enterprise resource planning (ERP) and other business systems, offers an excellent opportunity to attain these goals (Basiron, Y. and Chan, K W., 2004).

Conclusion

Performance measurement is used by industries to assess progress against set goals and objectives in a quantifiable way for effectiveness and efficiency. For the palm oil mills to stay competitive, it is imperative that they elevate the maintenance management role; from a cost center to the strategic partner in business. Performance cannot be managed without measurement; it provides the required information to the management for effective decision making. Research results demonstrate that companies using integrated balanced performance systems perform better than those who do not manage measurements (Kennerly and Neely, 2003; Lingle and Schiemann, 1996).

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